

Remarks

Claims 1-27 are pending in this application. Claims 24-27 are withdrawn from consideration. Claims 1-23 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (U.S. Publication No. US 2002/0124662 A1) in view of Daire et al. (U.S. Patent No. 5,440,930). Applicant believes that the invention is patentable.

A disadvantage associated with existing buffer systems is that a short buffer has problems when operating with hot fluids, while making the buffer longer requires that the buffer guide the wave front in the desired direction. Further, solid buffers fail to effectively guide the acoustic pulse resulting in a dispersive buffer that distorts the ultrasonic pulse and limits the usefulness of the flow meter. Specification, page 2, lines 6-10.

According to claim 1, an acoustic transducer for measuring a property of a fluid comprises an acoustic pulse generator, an impedance matching layer, and a thermal management system. The impedance matching layer is between the pulse generator and the fluid. The matching layer is formed of a low thermal conductivity material. The impedance matching layer has reduced length to the point where traveling waves are no longer present. The thermal management system is mounted to the matching layer to transfer heat from the matching layer. The thermal management system is formed of a high thermal conductivity material relative to the matching layer and is arranged along the matching layer such that substantial heat is transferred to the environment from the thermal management system without excessive temperature increase at the pulse generator.

Suzuki describes an ultrasonic transducer and flow meter. Suzuki adopts a short buffer approach and is directed specifically to transducer manufacture. The Examiner acknowledges that Suzuki is deficient in that the claimed thermal management system is not suggested by Suzuki.

Daire describes an ultrasonic measuring assembly and means for attaching the assembly to a vessel. There is no motivation to combine Suzuki and Daire to achieve the claimed invention.

In the final action, the Examiner states that “as long as some motivation or suggestion to combine the references is provided by the prior art taken as a whole, the law does not require that the references be combined for the reasons contemplated by the inventor.” (Citation omitted.)

The issue is not whether or not one of ordinary skill in the art would combine teachings of Suzuki et al. and Daire et al., the issue is whether or not one of ordinary skill in the art would be motivated to combine the teachings of Suzuki et al. and Daire et al. to achieve the claimed invention. The Examiner maintains that one of ordinary skill in the art would consider combining teachings of the two references. Applicant maintains that, without regard to whether one of ordinary skill in the art would consider the two references, there is no motivation to combine Suzuki and Daire to achieve the claimed invention.

Regarding Daire, in the illustrated embodiment, Daire describes simultaneously clamping the emitter 13 and receiver 14 against the spacers 11 and 12. As shown, the spacers 11, 12 are formed of a thermally conductive material and thin air cooling fins 20 are formed on the outer periphery of each spacer. As clearly depicted in Figures 1 and 2, the spacers 11 and 12 function as longer buffers as they sit between the transducers and the pipe 10 and are shaped in a way that would not effectively guide the wave front. As well, the overall assembly is clamped to the outside of pipe 10 resulting in further buffering of the pulses, limiting the usefulness of this flow meter.

It is not clear that any of the teachings of Daire would be readily usable in the short buffer approach of Suzuki in a way that would achieve the claimed invention. Specifically, it is not clear that any of the teachings of Daire would be readily usable in the

short buffer approach of Suzuki without resulting in a longer buffer due to the fact that the spacers in Daire sit between the transducers and the pipe.

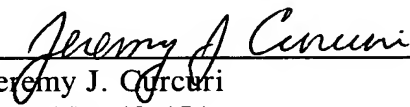
Claim 1 specifically recites “an impedance matching layer between the pulse generator and the fluid” in combination with the thermal management system arranged along the matching the layer, etc. Even if an attempt is made to combine the thermal management system in Daire with the ultrasonic transducer in Suzuki, any such combination would still fail to suggest the claimed invention. Adapting the thermal management system of Daire to Suzuki would result in a longer buffer approach, and no longer meet the recited claim limitation of “an impedance matching layer between the pulse generator and the fluid” while at the same time meeting the claim limitation “wherein the thermal management system is . . . arranged along the matching layer such that substantial heat is transferred to the environment from the thermal management system without excessive temperature increase at the pulse generator.” Thus, the combination proposed by the Examiner fails to meet all claim limitations.

In an attempt to provide evidence of motivation to combine the references to achieve the claimed invention, the Examiner states that the skilled artisan would be motivated to combine the teachings of Suzuki et al. and Daire et al. since Suzuki et al. states that his invention is applicable to an ultrasonic transducer that carries out a flow rate measurement through which fluid flows and Daire et al. is directed to ultrasonic flow meter using an ultrasonic transducer.”

The issue is not whether or not it would be possible to combine teachings from the two references, the issue is whether or not there is motivation to combine teachings to achieve the claimed invention. Even if the thermal management system of Daire were used in the ultrasonic transducer of Suzuki, such a combination would not meet the limitations recited by claim 1. After all, such a combination would effectively be attempting a longer buffer approach where the longer buffer is composed of the pipe wall and spacer.

Each independent claim recites in combination, an ultrasonic pulse generator, impedance matching layer, and thermal management system arranged in a certain way that is not suggested by the combination of references applied by the Examiner. The remaining claims that have been rejected are dependent claims and are believed to be patentable for the reasons given above. Applicant believes that the claims are in condition for allowance, and such action is respectfully requested.

Respectfully submitted,
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